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Skills Required for Platoon Leaders in the Objective Force Unit of Action

by Bruce S. Sterling and Cheryl A. Burns

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14. ABSTRACT

The objective of this research was to identify and measure skills required by platoon leaders in the objective force unit of action (UA). The research was embedded in a UA experiment conducted in simulation in the Unit of Action Maneuver Battle Lab. We used the Job Assessment Survey Software to examine types and levels of skill clusters and individual skills needed by platoon leaders. Results showed that for both the tasks of "maintain situational awareness" and "command and control the platoon," the clusters of conceptual, communication, and vision are important. Concerning individual skills, the highest ranking skills over both tasks combined were mental skills such as time sharing, selective attention, speed of closure and memorization; communication skills of oral comprehension and oral expression; and vision skills such as depth perception, night vision, far vision, and near vision. Platoon leaders have very high skill requirements for their level in the future force. However, these high ratings may well be as much attributable to their lack of experience as to the difficulty of the job. We propose human factors, training, and selection interventions to help meet skill demands.

15. SUBJECT TERMS

future leadership; future platoon leaders; future skills required; job assessment

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1. Introduction

1.1 Overview

The objective of this research was to identify and measure skills required by platoon leaders in the objective force unit of action (UA). We begin with an overview of the objective force environment in which these personnel will operate. Next, we review the experiment in which this research was embedded. We then discuss the method of data collection used in this research. We follow by presenting results concerning the ratings of skill clusters and individual skills. Finally, we discuss the implications of the findings in terms of human factors, training, and selection.

1.2 Objective Force Environment

The objective force will be a strategically deployable, tactically superior and sustainable force that will provide a quick reaction capability for a continuum of conflicts that arise in the 21st century. The objective force is envisioned to be a mixture of manned and unmanned combat systems. This force will incorporate and exploit information dominance to develop a common, relevant operating picture and to achieve situational awareness (SA) to dominate the battle space.

In order for the objective force to be effective, changes across doctrine, training, leader, organization, materiel, and Soldier (DTLOMS) will be necessary. Much of the effort concerning the future combat system (FCS) UA is focused on materiel. There will be new, lightweight, easily deployable and sustainable vehicles; advanced command, control, communications, computers, intelligence, surveillance, reconnaissance systems; precision munitions; plus aerial and ground robotic entities, to mention just a few. However, without concomitant changes in doctrine (e.g., see and engage at a distance), organization (e.g., separate but linked sensor-shooter platforms), leader (e.g., delegation of authority), training (e.g., ability to effectively control robotic platforms), and Soldier (e.g., different skills emphasized), the new materiel cannot be employed effectively. This report focuses mainly on the Soldier aspect of DTLOMS by examining the skills needed for the platoon leader position in the UA.

Future platoon leaders are expected to face a more complex set of conditions than "cold war" platoon leaders. They will face both symmetric (e.g., traditional military forces) and asymmetric (e.g., irregular forces using guerilla tactics) threats. Future platoon leaders can expect to operate in both open and urban terrain. They will rapidly fluctuate between low to mid-intensity conflict and peacemaking, perhaps over a matter of hours or city blocks. They will have to use robotic platforms, such as unmanned aerial vehicles (UAVs) and unmanned ground vehicles (UGVs) to be able to obtain the knowledge to engage the enemy at the place and time of his choosing, and "see first, understand first, act first." Although there will be times that closing with and

destroying the enemy is required, future platoon leaders will make much more use of non-line-of-sight (NLOS) fires than past or current platoon leaders. In order to cope with these new conditions, it is possible that different skills (or different amounts of current skills) will be required. The purpose of this research is to determine the skills needed by platoon leaders in the objective force environment.

1.3 Description of UA Concept Evaluation Program (CEP)

This description is an excerpt from the UA maneuver battle lab (UAMBL) CEP report. For more details, see UA concept experiment interim report 30 May 02 (Department of the Army, 2002). The experiment took place from 2 to 25 April 2002.

1.3.1 Experiment Overview

The virtual experiment of the UA CEP lasted 24 days and took place in the mounted warfare test bed at Fort Knox, Kentucky. The experiment included Soldier training, a situational training exercise (STX), a pilot trial, and 10 days of Soldier-in-the-loop trials. The operational environment and road to war were all developed from those used during the senior war-fighting group seminar sessions conducted by the U.S. Army Training and Doctrine Command (TRADOC) during the period October 2002 through January 2003.

The experiment placed a conceptual battalion-sized force, the UA combat battalion, equipped with a combination of manned and robotic platforms, against an array of opposing force (OPFOR) maneuver battalions plus supporting forces. These OPFOR battalions were organized into two combined arms brigades equipped with advanced technology combat systems and two battalions of a non-force-modernized mechanized brigade. Each tactical mission included three battalions of OPFOR dismounted infantry. All missions included civilians and host nation forces on the battlefield. Selected civilians were capable of executing hostile action against friendly or blue forces (BLUFOR) if they should be attacked by the BLUFOR, either by mistake or by intention. Two types of rear operations were conducted: “passive” support of the OPFOR in the form of intelligence gathering, and “active” support with teams conducting raids against high priority targets.

UA CEP used a Caucasus-Caspian Sea terrain database with an east-to-west orientation. This terrain database was generally flat in the east, becoming more mountainous in the western section. Ground-based visibility was typically good to excellent in the east and good to fair in the west. Numerous small towns and villages were present throughout the terrain database. In select sections, the significant number of streams, creeks, and irrigation canals affected cross-country trafficability. For each tactical mission, the combat battalion’s battle space was approximately 20 to 25 kilometers wide and 70 to 90 kilometers deep. Adding complexity to the terrain were non-combatants throughout the battle space. They were stationary and moving and included six different types of vehicles.

1.3.2 Training

The experiment began with a period of orientation and training for the participants. The training plan was designed to guide the participants through multiple phases of training, to provide a deliberate approach toward understanding the UA CEP FCS unit, and to use the available battle command information systems and tools in a confident, productive, and innovative manner. The "end state" of the training period was for each participant to have adequate understanding and proficiency of individual, intra-node, and inter-node skills. The training included

1. Information about the background, purpose, and objectives of the experiment;
2. Individual and collective training on the simulation systems to be used (e.g., advanced concept research tools; surrogate command, control, communications, and computer system; war fighters' electronic communication mapping system; voice communications system; etc.);
3. Collective tactical training in which the participants were presented with suggested ways to plan, prepare, and execute their missions with the organization and technology provided; and
4. A STX in which the participants fought a sample of the opposing force on terrain different from that in which the experimental trials would take place.

Following the completion of the orientation and training for the participants, a STX and pilot test were conducted.

The STX was designed to integrate learned training skills to give the participants confidence in achieving interoperability with non-standard organizations, weapons' platforms, and employment before the pilot and trial exercises. A white cell or unit of employment (UE) standing operating procedure (SOP) was available to all participants via their simulated command, control, communication, and computer (SC4) interface. These SOPs were to be used by the participants in the experiment when faced with a situation that could not be readily and combat-realistically replicated by the simulation. Even though a southwest USA terrain database was used during the STX, the brigade operations order and scenario were similar to those that would be used in the pilot trial and trials.

The pilot trial was used to determine if required data and information could be acquired during the execution of the experimental trials. The OPFOR and BLUFOR were assigned missions consistent with those they would execute during the experimental trials. Additionally, the data collection plan was implemented, and the UE or white control cell SOPs were followed. Following the successful execution of the pilot trial, experimental trials were begun.

There was no formal assessment of the training at the individual or collective level. The exercise director was satisfied that personnel were sufficiently trained in order to accomplish the goals of the experiment.

Following a 9-day period of user training and pilot exercises, the experimental trials portion of UA CEP lasted 10 days. During that time, four trials were conducted. Each of the two battalions executed the same mission twice. During trials 1 and 2, the two battalions executed their missions with "nearly perfect" communications. During trials 3 and 4, the missions were executed with a realistic, network communications model that required commanders to "maneuver their network" as well as their forces.

1.3.3 Personnel

A total of 234 personnel participated in the UA CEP experiment. The experiment had personnel requirements for the white cell, UA combat brigade headquarters, first and second UA combat battalions, OPFOR, and exercise support personnel. Most personnel were contractor computer support and Soldiers from the first squadron, second armored cavalry regiment who manned the first UA combat battalion. The additional exercise support personnel came from various TRADOC battle laboratories and Fort Knox.

1.3.4 Organization

The organization of the UA combat battalion and brigade was provided by the UA MBL as Version 2.0 of the UA organization. The organization was to serve as a starting point for the UA CEPs to be executed during fiscal year 2002 in TRADOC and for further investigation into block II development for FCS organizations.

The organization designers optimized the combat brigade for strategic deployability and operational and tactical maneuver. Fully capable for combat in a major theater of war and with an assumed technology readiness level of 6 by 2006, the combat brigade was assumed to also be capable of "off-the-ramp" combat and continuous operations for 72 hours. The organization was designed to be offensively oriented and able to conduct simultaneous, distributed, and continuous combined arms operations. It had a total weight of less than 8,000 short tons and fewer than 2,500 personnel. Although not examined in the UA CEP virtual experiment, the combat brigade was to be transportable by C130 and deployable in 96 hours.

Architects of the organization designed it to have accurate and synchronized networked fires with a sensor-to-shooter linkage that would permit 360-degree, long-range acquisition and targeting. Also included were precision delivered and remotely armed and disarmed minefields along with loitering and in-flight controllable precision munitions. Critical to the design was the developers' requirement for a mission-centric, embedded information system to enable networked battle command during movement and to provide a synthesized common relevant operating picture tailored to the unit task, purpose, and situation. Compensating for the lack of heavy armor, the designers integrated automated protection systems on most platforms in the organization and embedded a robust reconnaissance, surveillance, and target acquisition

capability throughout the combat brigade to facilitate the shaping of the battle space before committing to decisive operations.

The organization employed the combined arms concept throughout. Combined arms combat platoons comprised the combat companies. NLOS and beyond-line-of-sight (BLOS) capability was distributed throughout the combat brigade. Air defense capability and mobility capability were also thoroughly distributed in the organization and platform design. Modular in design, the organization was developed to be able to task reorganize while moving and to execute quick tactical transition without sapping operational momentum.

Heavy use of robotic platforms was made in the design of the organization. These robotic platforms provided capability in NLOS and BLOS effects, reconnaissance and surveillance (air and ground platforms and unattended ground sensors), cargo carrying, communications relay, and stand-off minefield and nuclear, biological, and chemical detection. While cargo-carrying platforms were in the "follower" mode of operation, other robotic platforms were generally semi-autonomous. Notable of this category were the numerous UAVs and selected combat platforms in the organization (e.g., robotic mortars, NLOS platforms, etc.).

2. Method

2.1 Participants

We examined skills needed by platoon leaders. A total of nine platoon leaders participated in the research. These platoon leaders were responsible for UAVs, UGVs, manned ground platforms, and dismounted troops. Displays used included operator control units to control or monitor UAVs and UGVs, the SC4 interface (akin to a more sophisticated Force XXI battle command brigade and below), as well as driver's and gunner's screens, plus simulated vision blocks to view "outside" the vehicle.

2.2 Instrument

The job assessment software system (JASS) addressed skills needed to perform tasks. The U.S. Army Research Laboratory (ARL) developed JASS, a computer-based tool to measure skill and ability requirements (Knapp and Tillman, 1998). JASS is developed from previous ARL work in scaling job demands (Muckler, Seven, and Akman, 1990) and in skill testing techniques (Rossmeissl, Tillman, Rigg, and Best, 1982). Fleishman and Quaintance (2000) developed the taxonomy of the 50 skills and abilities used in JASS. See table 1 for list of the 50 JASS skills and abilities, organized into the eight clusters. Appendix A presents definitions for all 50 individual skills.

Table 1. JASS skill clusters.

Cognitive Skill and Experience Clusters		Perceptual-Motor Ability Clusters	
Communications	Conceptual	Vision	Audition
1. Oral Comprehension	5. Memorization	24. Near Vision	31. General Hearing
2. Written Comprehension	6. Problem Sensitivity	25. Far Vision	32. Auditory Attention
3. Oral Expression	7. Originality	26. Night Vision	33. Sound Localization
4. Written Expression	8. Fluency of Ideas	27. Visual Color Discrimination	
	9. Flexibility of Closure	28. Peripheral Vision	
	10. Selective Attention	29. Depth Perception	
	11. Spatial Orientation	30. Glare Sensitivity	
	12. Visualization		
Reasoning	**Speed-Loaded**	**Psychomotor**	**Gross Motor**
13. Inductive Reasoning	19. Time Sharing	34. Control Precision	41. Extent Flexibility
14. Category Flexibility	20. Speed of Closure	35. Rate Control	42. Dynamic Flexibility
15. Deductive Reasoning	21. Perceptual Speed / Accuracy	36. Wrist-Finger Speed	43. Speed of Limb Movement
16. Information Ordering	22. Reaction Time	37. Finger Dexterity	44. Gross Body Equilibrium
17. Mathematical Reasoning	23. Choice Reaction Time	38. Manual Dexterity	45. Gross Body Coordination
18. Number Facility		39. Arm-Hand Steadiness	46. Static Strength
		40. Multi-Limb Coordination	47. Explosive Strength
			48. Dynamic Strength
			49. Trunk Strength
			50. Stamina

JASS runs on a personal computer in a Windows[1] environment. The program uses a flow chart format and asks a series of questions to which the subject answers "yes" or "no". "Yes" answers identify the need for a specific skill or ability, and following this, JASS presents a behaviorally anchored scale so that the subject can rank the skill demand from 1 to 7. The behavioral descriptions are presented on the scale as "anchor points" to help the subject select a relative score. The JASS program saves the scores in a database for later analysis.

JASS was given for the tasks "maintain situational awareness" (SA) and "command and control the platoon." Maintaining SA was defined as "being aware of the location of your own unit, enemy units, and the commander's intent in order to perform the mission." Command and control of the platoon was defined as "managing and maneuvering personnel, equipment, or materiel in order to support the course of action necessary to achieve your desired end state".

2.3 Procedure

JASS was administered once at the end of the last exercise on a bank of stand-alone computers.

[1]Windows™ is a trademark of Microsoft.

2.4 Analysis

Because of the small number of participants (nine), only descriptive statistics were reported.

3. Results

3.1 Clusters for "Maintain SA"

Figure 1 shows the skill clusters for leaders for the tasks "maintain SA" and "command and control the platoon." For maintain SA, clusters with means above 4.0 (on a 0-to-7 scale) were vision, conceptual, and communication.

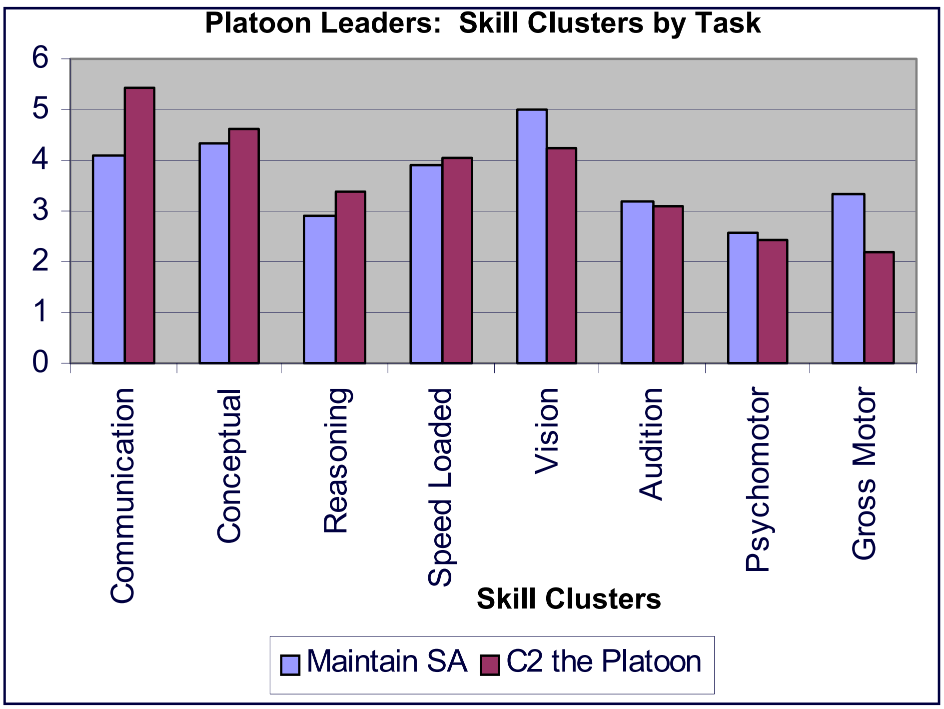

Figure 1. Skills needed to maintain SA and to command and control the platoon.

Vision refers to visual acuity (near vision, far vision, night vision, day vision). This suggests that viewing the command and control (C2) screens and other displays to maintain SA may have required a fairly high degree of visual skills. The conceptual cluster involves skills such as memorization, ability to concentrate on a task and ignore distracting stimuli (selective attention), ability to think creatively to solve problems (originality, fluency of ideas), and ability to identify potential problems (problem sensitivity). It makes sense that platoon leaders must memorize certain information in order to maintain SA. Platoon leaders must remember call signs to request information from someone or to know from whom a given report came. Knowledge of commander's critical information requirements (CCIR) is necessary to know what information to

seek or provide. Remembering the commander's intent is necessary to understand if the situation is proceeding according to plans or going awry. Also, skills to identify and creatively solve problems appear to be necessary for platoon leaders to maintain SA. This makes sense if one thinks of SA as an active rather than passive process. That is, to maintain SA, one must not only see icons on a screen but must also understand the situation that those icons represent, including potential problems and possible solutions to those problems (Endsley, 2000). Communication involves the ability to understand and be understood in oral and written communication. Platoon leaders must therefore be able to clearly ask for information needed in order to maintain SA and understand responses to their requests for information.

There were three clusters with means above 3.0: speed loaded, audition, and gross motor. The mean for speed loaded was well above 3.0, while the mean for the other two was just above 3.0. Speed loaded involves skills such as the ability to shift between different sources of information (time sharing), quickly recognize patterns (speed of closure), and quickly compare patterns (perceptual speed and accuracy). This suggests that platoon leaders may need to shift between different sources of information, such as different screens, or visual and auditory information, and to recognize or compare patterns in order to maintain SA. Audition involves skills such as general hearing and the ability to focus on a single source of auditory information (auditory attention). This suggests that listening to information coming over different radio nets simultaneously may be a skill that platoon leaders need, at least to a lesser extent. Gross motor involves skills such as multi-limb coordination, strength, stamina, and speed. While it is unlikely that such skills were needed in this simulation, it may be that platoon leaders were "projecting" to the real world, in which moving over terrain is necessary in order to acquire SA.

There were two clusters with means above 2.0: reasoning and psychomotor. Reasoning involved mainly mathematical ability, and psychomotor involved coordination or fine muscle movements. Neither of these clusters of skills was highly required. In the case of psychomotor, this suggests that the interface (e.g., use of the mouse) was reasonably well designed.

3.2 Clusters for "Command and Control the Platoon"

There was one cluster with a mean above 5.0 for the task "command and control the platoon": communication. Thus, the ability to understand others and make oneself understood is critical to C2. This makes sense, since understanding and giving orders are critical to C2.

There were three clusters with mean ratings above 4.0 for the C2 task: conceptual, vision, and speed loaded. It seems logical that skills to identify and creatively solve problems appear to be necessary for platoon leaders to command and control their platoon, since leaders will have to react to changing circumstances. For vision, it again seems reasonable that viewing the C2 screens is necessary for one to be able to command and control the platoon, since viewing (and understanding) the changing situation is critical to C2. For speed loaded, shifting between different sources of information, such as different screens, or visual and auditory information in

order to recognize or compare patterns should be important to C2, since leaders must react to the ongoing situation in order to be successful.

The other four clusters (reasoning and audition [means above 3.0]; and psychomotor and gross motor [means above 2.0]) were less important for the task of commanding and controlling the unit.

The cluster means for platoon leaders are some of the highest encountered in these researchers' use of JASS. One hypothesis concerning why the skill ratings of platoon leaders are so high is because of their relative lack of experience compared to higher level leaders. This hypothesis was supported by a supplemental analysis. Three of the platoon leaders were senior sergeants who had much more Army experience than lieutenants. Their ratings of skills needed were generally substantially lower than the lieutenants' ratings on both tasks (see figures 2 and 3). The only exception for an important cluster was for speed loaded on the task "maintain SA." There, ratings were nearly equivalent for sergeants and lieutenants.

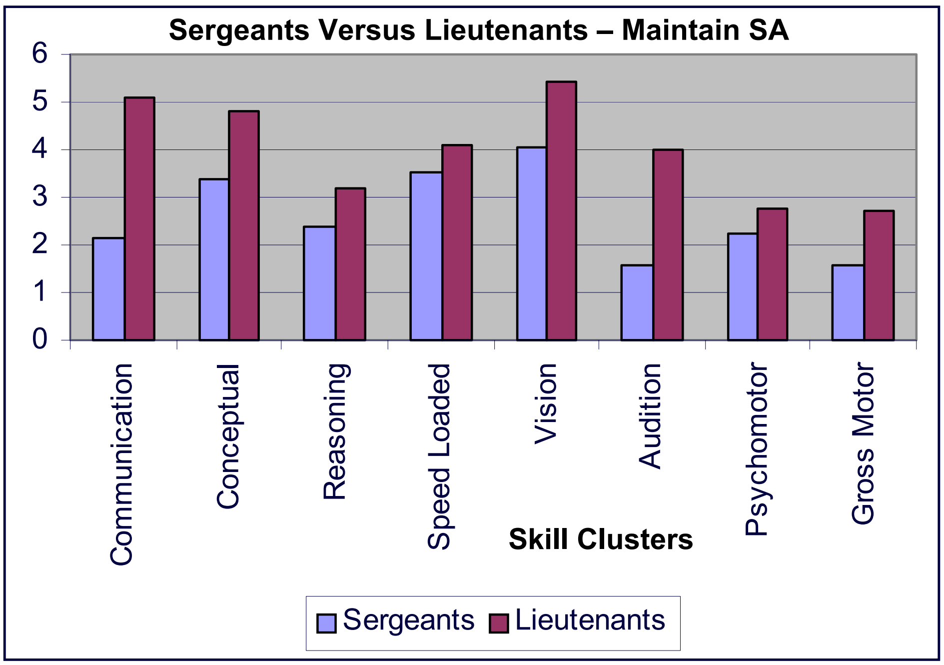

Figure 2. Skills needed to maintain SA for sergeants versus lieutenants.

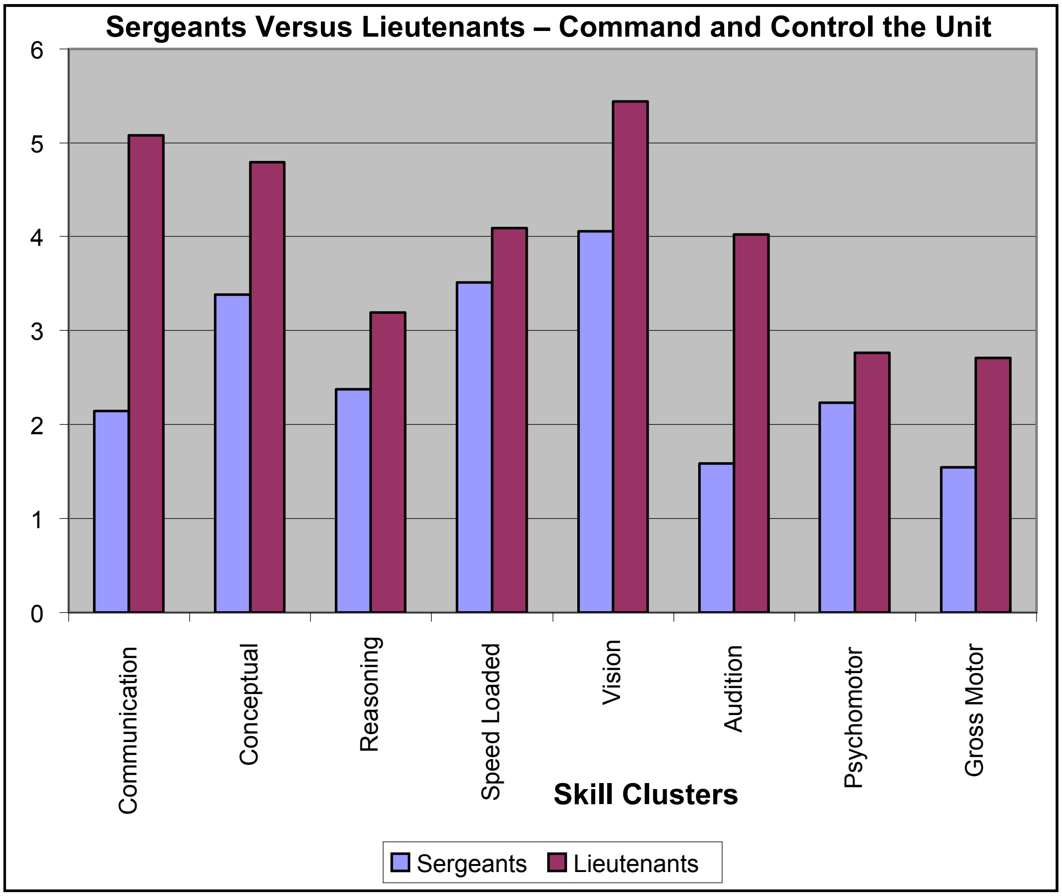

Figure 3. Skills needed to command and control the unit for sergeants versus lieutenants.

3.3 Individual Skills for Both Leader Tasks Combined

Table 2 shows the 10 highest rated skills for both tasks combined. These skills seem to fall into three groups: a group of vision skills, a group of mental skills from the speed loaded and conceptual clusters, and a group of communication skills. The vision skills that are needed include night vision, near and far vision, and depth perception. The need for these skills makes sense in terms of viewing displays at distances and during limited light conditions. Depth perception may refer to judging distances via the simulated vision blocks. The mental skills include memorization, selective attention, time sharing, and speed of closure. This represents the picture of trying to focus on a specific task, shift attention between sources of information, quickly identify patterns, while remembering CCIR or commander's intent. The communication skills include oral comprehension and expression. Thus, platoon leaders need to understand (verbal) direction from higher or information from lower, while clearly expressing themselves (verbally) in terms of information to higher or direction to lower.

Table 2. Ten highest rated skills for platoon leaders.

Cluster	Skill	Rating
Speed Loaded	Time Sharing	5.53
Conceptual	Selective Attention	5.27
Conceptual	Memorization	5.22
Vision	Depth Perception	5.19
Speed Loaded	Speed of Closure	5.17
Communication	Oral Comprehension	5.07
Vision	Night Vision	5.06
Vision	Far Vision	4.96
Vision	Near Vision	4.94
Communication	Oral Expression	4.86

4. Conclusions and Recommendations

4.1 Conclusions

The top four clusters for both the task "maintain SA" and "command and control the platoon" were vision, conceptual, communication, and speed loaded, although not necessarily in that order for both tasks. The top 10 individual skills for both tasks combined also came from those four clusters. The importance of the conceptual and speed loaded clusters[2] seems to relate to the recognition primed decision model (Klein, 1997). In this model, experts make decisions on the basis of recognizing a pattern they have experienced in the past and formulate a course of action that was successful in addressing that pattern. This ability may be important to future leaders, even at platoon level.

4.2 Recommendations

Skill requirements for the positions examined appear highest for communication, conceptual, speed loaded, and vision. There are at least three methods of satisfying the demands for these skills: Design the materiel in order to reduce the need for the skill, train Soldiers in the skill, or select and assign for the skill. Each of these methods will be examined in turn.

Human factors could be applied to reduce the need for conceptual, speed loaded, and vision. Perhaps the best way to simultaneously reduce the need for all three skills would be to develop a common operational picture (COP) interface. The COP is critical to leaders who are experienced or inexperienced, at any command level. The COP enables leaders to "see first, understand first, and act first," which is the heart of the Objective Force concept. This would reduce the need for conceptual skills, since it should be easier to recognize potential problems (problem sensitivity)

[2]With specific skills such as pattern recognition (speed of closure) and several other skills from that cluster that were not ranked in the top ten but are related to pattern recognition, such as the ability to recognize a potential problem (problem sensitivity) and quickly compare patterns (perceptual speed and accuracy)

if a Soldier did not have to shift between several interfaces in order to conduct conceptual activities. Speed loaded skills would also likely be reduced, since Soldiers would not have to shift focus between different displays (time sharing). However, leaders would still have to fuse auditory and visual information. Also, leaders might want to look at different "windows" on the same screen to avoid information overload by presenting all information on one screen at the same time. Finally, vision skills would likely be reduced if a Soldier did not have to look across the vehicle to see all the information necessary to do his job.

Of course, other human factors interventions could also be performed. Human factors engineering could be used to improve conceptual skills by providing decision aids in pattern recognition (speed of closure). Subject matter expert input could be used to identify recurring, important patterns. Then, when a pattern is found by the software, platoon leaders could be cued to its presence, e.g., "enemy air defense units located on aerial sensor route" or "threat vehicle near direct fire range." In order to help improve vision, optimizing human factors design seems to be advisable. For instance, icons should be designed to be easily recognizable as representing a specific entity. Increasing light levels in the vehicle and providing the ability to easily change map size to enlarge icons in a given area would also help reduce visual skills required. A "tab" provided by higher headquarters with call signs, CCIR, and commander's intent could reduce the need for memorization.

For the conceptual, communication, and speed loaded clusters, specifically designed training also seems to be important. Fast-paced scenarios where personnel must receive and provide information (communication, and specifically oral comprehension and expression), combine information from several sources, and perform multiple tasks (speed loaded, specifically time sharing and selective attention) in order to recognize patterns and problems (problem sensitivity, perceptual speed and accuracy), would likely be beneficial. Platoon leaders, especially junior lieutenants, would be particularly likely to benefit from substantial realistic training.

Personnel selection or assignment might also play a role. While personnel could be screened for any of these skills, vision (depth perception, far, night, vision) seems to be among skills that are difficult or impossible to learn and is thus a good candidate for selection.

The job of future platoon leaders appears to be very demanding in terms of the types and levels of skills needed. To the extent possible, effective human factors engineering needs to be employed to help reduce skill demands. Realistic training, employing high driver skills, also needs to be designed. For those skill demands that cannot be reduced by human factors engineering or training, Soldiers possessing those skills must be recruited for future platoon leader positions.

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Appendix A. List of JASS Skills and Definitions

Skill Num.	Skill Name	Description
1	ORAL COMPREHENSION	The ability to listen to and understand words and sentences.
2	WRITTEN COMPREHENSION	The ability to understand written words, sentences, and paragraphs.
3	ORAL EXPRESSION	The ability to use words or sentences in speaking so that others will understand.
4	WRITTEN EXPRESSION	The ability to use words and sentences in writing so that others will understand.
5	MEMORIZATION	The ability to memorize and remember information, such as words, numbers, pictures, and procedures. Pieces of information can be remembered by themselves or with other pieces of information.
6	PROBLEM SENSITIVITY	The ability to tell when something is wrong or likely to go wrong. It includes being able to identify the whole problem as well as the elements of the problem.
7	ORIGINALITY	The ability to produce unusual or clever ideas about a given topic or situation. It is the ability to invent creative solutions to problems or develop new procedures for situations in which standard procedures do not apply or are not working.
8	FLUENCY OF IDEAS	The ability to produce a number of ideas about a given topic.
9	FLEXIBILITY OF CLOSURE	The ability to identify or detect a known pattern (like a figure, word, or object) that is hidden in other material. The task is to pick out the disguised pattern from the background material. (Pattern Recognition)
10	SELECTIVE ATTENTION	The ability to concentrate on a task one is doing. This ability includes concentrating while performing a boring task and not being distracted.
11	SPATIAL ORIENTATION	The ability to tell where you are in relation to the location of some object or to tell where the object is in relation to you.
12	VISUALIZATION	The ability to imagine how something will look when it is moved around or when its parts are moved or rearranged. It requires the forming of mental images of how patterns or objects would look after certain changes, such as unfolding or rotation.
13	INDUCTIVE REASONING	The ability to combine separate pieces of information, or specific answers to problems, to form general rules or conclusions. It involves the ability to think of possible reasons for why things go together.
14	CATEGORY FLEXIBILITY	The ability to produce many rules so that each rule tells how to group a set of things in a different way. Each different group must contain at least two things from the original set of things.
15	DEDUCTIVE REASONING	The ability to apply general rules to specific problems to come up with logical answers. It involves deciding if an answer makes sense.
16	INFORMATION ORDERING	The ability to follow correctly a rule or set of rules to arrange things or actions in a certain order. The rule or set of rules used must be given. The things or actions to be put in order can include numbers, letters, words, pictures, procedures, sentences.
17	MATHEMATICAL REASONING	The ability to understand and organize a problem and then select a mathematical method or formula to solve the problem. It encompasses reasoning through mathematical problems to determine appropriate operations that can be performed to solve problems.
18	NUMBER FACILITY	Involves the degree to which adding, subtracting, multiplying, and dividing can be done quickly and correctly. These can be steps in other operations, like finding percentages and taking square roots.

Skill Num.	Skill Name	Description
19	TIME SHARING	The ability to shift back and forth between two or more sources of information
20	SPEED OF CLOSURE	Involves the degree to which different pieces of information can be combined and organized into one meaningful pattern quickly. It is not known beforehand what the pattern will be. The material may be visual or auditory.
21	PERCEPTUAL SPEED AND ACCURACY	Involves the degree to which one can compare letters, numbers, objects, pictures, or patterns, quickly and accurately. The things to be compared may be presented at the same time or one after the other. This ability also includes comparing a presented object to another object.
22	REACTION TIME	The ability to give one fast response to one signal (sound, light, picture) when it appears. This ability is concerned with the speed with which the movement can be started with the hand, foot, or other parts of the body.
23	CHOICE REACTION TIME	The ability to choose between two or more movements quickly and accurately when two or more different signals (lights, sounds, pictures) are given.
24	NEAR VISION	The capacity to see close environmental surroundings.
25	FAR VISION	The capacity to see distant environmental surroundings.
26	NIGHT VISION	The ability to see under low light conditions.
27	VISUAL COLOR DISCRIMINATION	The capacity to match or discriminate between colors. This capacity also includes detecting differences in color purity (saturation) and brightens (brilliance).
28	PERIPHERAL VISION	The ability to perceive objects or movements towards the edges of the visual field.
29	DEPTH PERCEPTION	The ability to distinguish which of several objects is more distant from or nearer to the observer, or to judge the distance of an object from the observer.
30	GLARE SENSITIVITY	The ability to objects in the presence of glare or bright ambient lighting.
31	GENERAL HEARING	The ability to detect and to discriminate among sound that vary over broad ranges or pitch and/or loudness.
32	AUDITORY ATTENTION	The ability to focus on a single source of auditory information in the presence of other distracting and irrelevant auditory stimuli.
33	SOUND LOCALIZATION	The ability to identify the direction from which an auditory stimulus originated relative to the observer.
34	CONTROL PRECISION	The ability to move controls of a machine or vehicle. This involves the degree to which these controls can be moved quickly and repeatedly to exact positions.
35	RATE CONTROL	The ability to adjust an equipment control in response to changes in the speed and/or direction of a continuously moving object or scene. The ability does not extend to situations in which the speed and direction of the object are perfectly predictable.
36	WRIST-FINGER SPEED	The ability to make fast, simple, repeated movements of the fingers, hands, and wrists. It involves little, if any, accuracy or eye-hand coordination.
37	FINGER DEXTERITY	The ability to make skillful, coordinated movements of the fingers of one or both hands and to grasp, place, or move small objects. This ability involves the degree to which these finger movements can be carried out quickly.
38	MANUAL DEXTERITY	The ability to make skillful coordinated movements of one hand, a hand together with its arm, or tow hands to grasp, place, move, or assemble objects like hand tools or blocks.
39	ARM-HAND STEADINESS	The ability to keep the hand and arm steady. It includes steadiness while making an arm movement as well as while holding the arm and hand in one position. This ability does not involve strength or speed.
40	MULTI-LIMB COORDINATION	The ability to coordinate movements of two or more limbs (for example, two legs, or one leg and one arm), such as in moving equipment controls. Two or more limbs are in motion while the individual is sitting, standing or lying down.
41	EXTENT FLEXIBILITY	The ability to bend, stretch, twist, or reach out with the body, arms, or legs.
42	DYNAMIC	The ability to bend, stretch, twist, or reach out with the body, arms, and/or legs,

Skill Num.	Skill Name	Description
	FLEXIBILITY	both quickly and repeatedly.
43	SPEED OF LIMB MOVEMENT	Involves the speed with which a single movement of the arms or legs can be made and/or repeated. This ability does not include accuracy, careful control, or coordination of movement.
44	GROSS BODY EQUILIBRIUM	The ability to keep or regain one's body balance or to stay upright when in an unstable position. This ability includes maintaining one's balance when changing direction while moving or standing motionless.
45	GROSS BODY COORDINATION	The ability to coordinate the movement of the arms, legs, and torso together in activities in which the whole body is in motion.
46	STATIC STRENGTH	The ability to use muscle force in order to lift, push, pull, or carry objects. It is the maximum force that one can exert for a brief period of time.
47	EXPLOSIVE STRENGTH	The ability to use short bursts of muscle force to propel oneself or an object. It requires gathering energy for bursts of muscle effort over a very short time period.
48	DYNAMIC STRENGTH	The ability of the muscles to exert force repeatedly or continuously over a long time period. This is the ability to support, hold up, or move the body's own weight and/or objects repeatedly over time.
49	TRUNK STRENGTH	Involves the degree to which one's stomach and lower back muscles can support part of the body repeatedly or continuously over time. The ability involves the degree to which these trunk muscles do not fatigue when they are put under repeated or continuous exertion.
50	STAMINA	The ability of the lungs and the circulatory systems of the body to perform efficiently over long time periods. This is the ability to exert oneself physically without getting out of breath.

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